This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Cancelled)

2. (Currently Amended) The apparatus of claim 4 ~~1~~ wherein the signal is expressed as a probabilistic representation.

3. (Cancelled)

4. (Currently Amended) ~~The apparatus of claim 3~~ Signal-processing apparatus comprising:

    a. a plurality of continuous-time delay elements for receiving a time-varying signal, each of the continuous-time delay elements imposing a corresponding delay on the signal; and

    b. a plurality of continuous-time computational elements for receiving delayed components of the signal from the continuous-time delay elements, the continuous-time computational elements each producing an output based on probability distributions associated with different possible states of at least one signal component, wherein the computational elements cooperate to effect a series of computational operations on the signal components in a predetermined order, the predetermined order being enforced by the delays imposed by the delay elements, and wherein the computational elements are soft gates and the computational operations are soft logic operations.

5. (Currently Amended) The apparatus of claim 4 ~~3~~ wherein the predetermined order corresponds to an algorithm.

6. (Original) The apparatus of claim 5 wherein the algorithm is a belief propagation algorithm.

7. (Original) The apparatus of claim 5 wherein the algorithm is a statistical estimation algorithm.

8. (Original) The apparatus of claim 5 wherein the algorithm performs multi-user detection.

9. (Original) The apparatus of claim 5 wherein the algorithm is a decoding algorithm.

10. (Original) The apparatus of claim 5 wherein the algorithm corresponds to a factor graph.

11. (Original) The apparatus of claim 10 wherein inputs to the factor graph are received from the delay elements.

12. (Currently Amended) The apparatus of claim 4 ~~1~~ wherein the delay elements cause a plurality of temporally distinct signal components to reach a single computational element simultaneously.

13. (Currently Amended) The apparatus of claim 4 ~~3~~ wherein the computational elements are arranged in a network, and further comprising a receiving module for assigning probability values to different possible states of the signal when it arrives and communicating the probability values to at least a first computational element in the network, the computational elements producing outputs based on the probability values.

14. (Currently Amended) ~~The apparatus of claim 1~~ Signal-processing apparatus comprising:

a. a plurality of continuous-time delay elements for receiving a time-varying signal, each of the continuous-time delay elements imposing a corresponding delay on the signal; and

b. a plurality of continuous-time computational elements for receiving delayed components of the signal from the continuous-time delay elements, the continuous-time computational elements each producing an output based on probability distributions associated with different possible states of at least one signal component, wherein at least some of the delay elements are filters, lump delay circuits, or soliton delay elements.

15. (Currently Amended) ~~The apparatus of claim 1~~ Signal-processing apparatus comprising:

a. a plurality of continuous-time delay elements for receiving a time-varying signal, each of the continuous-time delay elements imposing a corresponding delay on the signal; and

b. a plurality of continuous-time computational elements for receiving delayed components of the signal from the continuous-time delay elements, the continuous-time computational elements each producing an output based on probability distributions associated with different possible states of at least one signal component, wherein at least some of the delay elements conserve an amplitude of the signal components.

16. (Cancelled)

17. (Currently Amended) The apparatus of claim 14 ~~16~~ wherein at least some of the delay elements are filters and at least some of the filters are low-pass filters.

18. (Currently Amended) The apparatus of claim 14 ~~16~~ wherein at least some of the delay elements are filters and at least some of the filters are band-pass filters.

19. (Currently Amended) The apparatus of claim 14 ~~16~~ wherein at least some of the delay elements are filters and at least some of the filters ~~delay elements~~ are linear phase filters.

20. (Cancelled)

21. (Currently Amended) ~~The apparatus of claim 1~~ Signal-processing apparatus comprising:

a. a plurality of continuous-time delay elements for receiving a time-varying signal, each of the continuous-time delay elements imposing a corresponding delay on the signal; and

b. a plurality of continuous-time computational elements for receiving delayed components of the signal from the continuous-time delay elements, the continuous-time computational elements each producing an output based on probability distributions associated with different possible states of at least one signal component, wherein at least some of the delays arise from bandwidth limitations of the computational elements or of connections among the computational elements.

22. (Cancelled)

23. (Currently Amended) ~~The apparatus of claim 3~~ Signal-processing apparatus comprising:

a. a plurality of continuous-time delay elements for receiving a time-varying signal, each of the continuous-time delay elements imposing a corresponding delay on the signal; and

b. a plurality of continuous-time computational elements for receiving delayed components of the signal from the continuous-time delay elements, the continuous-time computational elements each producing an output based on probability distributions associated with different possible states of at least one signal component, wherein the computational elements cooperate to effect a series of computational operations on the signal components in a predetermined order, the predetermined order being enforced by the delays imposed by the delay elements, and wherein the time-varying signal is produced by a transmitter having a clock rate, the delay elements having an upper bandwidth limitation no greater than the transmitter's clock rate and cooperating to synchronize performance of the series of computational operations to the transmitter's clock.

24. (Currently Amended) ~~The apparatus of claim 3~~ Signal-processing apparatus comprising:

a. a plurality of continuous-time delay elements for receiving a time-varying signal, each of the continuous-time delay elements imposing a corresponding delay on the signal; and

b. a plurality of continuous-time computational elements for receiving delayed components of the signal from the continuous-time delay elements, the continuous-time computational elements each producing an output based on probability distributions associated with different possible states of at least one signal component, wherein the computational elements cooperate to effect a series of computational operations on the signal components in a predetermined order, the predetermined order being enforced by the delays imposed by the delay elements, and wherein the computational elements are dynamically reprogrammable to carry out any of a plurality of computational operations.

25. (Original) The apparatus of claim 24 wherein the delay elements are dynamically reprogrammable to impose any of a plurality of delays.

26. (Original) The apparatus of claim 25 wherein interconnects between delay elements and computational elements can be dynamically reprogrammed to connect different delay elements to different computational elements.

27-54. (Cancelled)

55. (Currently Amended) An apparatus for acquiring an encoded time-varying digital signal having a clock rate and having a plurality of signal components, each component representing one of a discrete set of values, the apparatus comprising:

a. a receiver;

b. a probability module, in communication with the receiver, for outputting a plurality of continuous-time probability signals, wherein each probability signal represents a probability that a received signal component corresponds to one value of the discrete set of values; and

c. a noise-lock loop ~~further~~ comprising a network of analog delays and analog computational elements, wherein the analog delays and analog computational elements operate on the probability signals to (i) remove high frequency noise from the probability signals (ii) synchronize with the clock rate of the time-varying digital signal and (iii) decode the time-varying digital signal.

56. (Original) The apparatus of claim 55 wherein the noise lock loop decodes the time-varying signal only if the receiver is an intended recipient thereof.

57. (Original) An apparatus corresponding to one of a plurality of users for acquiring an encoded time-varying digital signal having a clock rate and having a plurality of signal components, each component representing one of a discrete set of values, the time-varying signal having one of a plurality of users as an intended recipient, the apparatus comprising:

a. a receiver;

b. a probability module, in electrical communication with the receiver, for outputting a plurality of continuous-time probability signals, wherein each probability signal represents a probability that a received signal component corresponds to one value of the discrete set of values; and

c. a noise-lock loop in electrical communication with the probability module and receiving the probability module outputted probability signals, the noise-lock loop comprising a network of analog delays and analog computational elements, wherein the analog delays and analog computational elements operate on the probability signals to (i) remove high frequency noise from the probability signals (ii) synchronize the apparatus with the clock rate of the time-varying digital signal and (iii) detect whether a user of the apparatus is an intended recipient of the signal.

58. (Currently Amended) The apparatus of claim 57 ~~51~~, wherein the encoded time-varying digital signal is produced by a spread spectrum transmission.